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10/540,941	06/29/2005	Jianye Jiang	80363(47762)	3798

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EXAMINER	
LEWIS, BEN	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,941	JIANG ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. The Applicant's amendment filed on August 25th, 2008 was received. Claims 1, 2 and 8 were amended. Claims 11 and 12 were added.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (issued on May 23rd, 2008).

Claim Rejections - 35 USC § 103

3. Claims 1,7, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) in view of Ilno et al. (U.S. Pub. No. 2002/0086198 A1).

With respect to claims 1,8 and 10, LeCostaouec disclose carbon fiber reinforced plastic bipolar plates (title) wherein, the starting fiber reinforcement can take on a variety of forms but essentially involves a carbon fiber mat which is woven, non-woven (entangled), knit, stitch bonded or a combination of woven, knit, stitch bonded and staple fibers. The mat is subsequently needle punched to orient a large portion of the carbon fibers in the through thickness direction, allowing it to achieve maximum electrical conductivity in the direction where it is the most important. For the bipolar plate, the preferred path is parallel to the plate thickness. Such a carbonaceous mat may include thermoplastic fibers which are then heat molded into the desired shape to

create grooves or other surface features heretofore typically achieved by machining. Alternatively, the mats may be impregnated with a thermoplastic resin (powder or solution form) (electrically conductive powder) and molded to shape using suitable temperature and pressure (Paragraph 0014). (Examiner notes that the nonwoven mat of LeCostaouec is made of nonwoven (entangled) carbon fibers. The punching of the carbon fiber mat of LeCostaouec is to enhance electrical conductivity and does not alter the fact that the carbon fibers of LeCostauec are nonwoven (entangled)).

With respect to conductive powder, LeCostaouec teach that the use of heat-treated pre-oxidized carbon fiber (electrically conductive powder), heat-treated thermoset pitch fiber, carbon PAN fiber or pitch carbon fiber through the thickness of the bipolar plate will optimize electrical and thermal conductivity (Paragraph 0030). LeCostaouec also teach that alternatively, the mats may be impregnated with a thermoplastic resin (powder or solution form) (electrically conductive powder) and molded to shape using suitable temperature and pressure (Paragraph 0014).

With respect to shaping the softened nonwoven fabric, LeCostaouec teach that processing of the final product is accomplished by a number of thermoforming processes (application of temperature and pressure): diaphragm forming, compression molding, pressure/vacuum forming, resin transfer molding, lamination or stamping to consolidate the thermoplastic matrix (Paragraph 0033).

Le Costaouec does not specifically teach the diameter of the fibers. However, Ilno et al. disclose an electrically conducting curable composition and cured product (title) wherein the electrically conducting curable resin composition and cured product

thereof not only have high electrical conductivity, but also excellent heat radiation property, high heat resistance and good corrosion resistance, and therefore are suitable for use as a highly electrically conducting material such as separator for fuel cells (See Abstract). Depending on the use end of the curable resin composition or the cured product, it is preferable to use graphite as the main component and structure the entire carbonaceous filler by a combination or composite system with carbon black and/or carbon short fiber (preferably with carbon short fiber) (Paragraph 0029). Examples of the carbon short fiber include middle carbon fiber, vapor grown carbon fiber and carbon nanotube. From the standpoint of improving the electrical and mechanical properties, the carbon short fiber is more preferably vapor grown carbon fiber having a fiber diameter of 0.05 to 10 μm and a fiber length of 1 μm to 5 μm and/or carbon nanotube having a fiber diameter of 0.005 to 5 μm and a fiber length of 1 to 100μm (Paragraph 0030). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the fiber diameter of Ilno et al. in the separator production of Le Costaouec because Ilno et al. teach that from the standpoint of improving the electrical and mechanical properties, the carbon short fiber is more preferably vapor grown carbon fiber having a fiber diameter of 0.05 to 10 μm and a fiber length of 1 μm to 5 μm and/or carbon nanotube having a fiber diameter of 0.005 to 5 μm and a fiber length of 1 to 100 μm (Paragraph 0030).

With respect to claim 7, LeCostaouec teach that Processing of the final product is accomplished by a number of thermoforming processes (application of temperature and pressure): diaphragm forming, compression molding, pressure/vacuum forming, resin transfer molding, lamination or stamping to consolidate the thermoplastic matrix. 0033

4. Claims 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) and Ilno et al. (U.S. Pub. No. 2002/0086198 A1) in view of Kitade et al. (U.S. Patent No. 2003/0129471 A1).

With respect to claims 2 and 11, LeCostaouec as modified by Ilno et al. disclose a bipolar plate in paragraph 3 above. LeCostaouec as modified by Ilno et al. do not specifically teach that the nonwoven fabric has an content of the electrically conductive powder of 70 wt% or more. However, Kitade et al. disclose a composite material for fuel separator (title) wherein, from the view point of properties such as surface smoothness of the obtained separator and cell performance, it is desirable that volatile components in the carbonaceous powder are 2% by weight or less, particularly 1% by weight or less. Also, the fixed carbon content (electrically conductive carbon powder) is preferably 98% by weight or more, particularly preferably 99% by weight or more (Paragraph 0029). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to

incorporate the carbon content of Kitade et al. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. in order to enhance cell performance.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) and Ilno et al. (U.S. Pub. No. 2002/0086198 A1) in view of Kitade et al. (U.S. Patent No. 2003/0129471 A1).

With respect to claim 3, LeCostaouec as modified by Ilno et al. disclose a bipolar plate in paragraph 3 above. LeCostaouec as modified by Ilno et al. do not specifically teach that the electrically conductive powder has an average particle size which is at least ten times the diameter of the thermoplastic resin fibers and not more than one third the length of the thermoplastic resin fibers.

However, Kitade et al. disclose a composite material for fuel separator (title0 wherein, From the viewpoint of properties such as separator performance, particle size (primary particle size) of the carbonaceous powder is preferably 1,000 .μm or less, more preferably 500 μm or less, particularly preferably 300 μm or less, as maximum particle size. However, from the viewpoint of properties such as moldability and performance of the separator, it is desirable that fine powders (e.g., fine powders of 0.1 μm or less) are not contained, so that the average particle size is preferably from 1 to 100 μm more preferably from 3 to 70..μm particularly preferably from 5 to 50 μm (Paragraph 0030).

Kitade et al. also teach that in the case of a carbonaceous powder such as carbon fiber, it is desirable that the fiber diameter is generally from 1 to 50 μm,

preferably from 3 to 20 μm, particularly from 4 to 15 μm. The fiber length is generally from 10 to 500 μm, preferably from 50 to 500 μm more preferably from 100 to 500 μm. In this connection, this fiber length is average fiber length in a composite material for fuel cell separator molding (Paragraph 0031).

. Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the carbonaceous powder diameter of Kitade et al. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. in order to enhance moldability and performance of the separator (Paragraph 0030). .

6. Claims 4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) and Ilno et al. (U.S. Pub. No. 2002/0086198 A1) in view of Wilde et al. (U.S. bub. No. 2003/0194557 A1).

With respect to claims 4 and 12, LeCostaouec as modified by Ilno et al. disclose a bipolar plate in paragraph 3 above. LeCostaouec as modified by Ilno et al. do not specifically teach wherein the nonwoven fabric has a porosity of 50% or more. However, Wilde et al. disclose a carbon fiber electrode substrate for electrochemical cells (title) wherein, The electrode substrate of the invention is obtained as rolled good (rollable to a reel diameter of from about 250 to about 300 mm) with a large porosity (in excess of 80%) as necessary for unhindered mass transfer without undue lowering of the conductivity (Paragraph 0022). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was

made to incorporate the separator porosity of Wilde et al..into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. so that there would be unhindered mass transfer of the filler material without undue lowering of the conductivity. .

The disclosure LeCostaouec as modified by Ilno et al. and Wilde et al. differs from Applicant's claims in that LeCostaouec as modified by Ilno et al. and Wilde et al. do not disclose a porosity of the non woven fabric of 75% or less. However, LeCostaouec as modified by Ilno et al. and Wilde et al. recognize the effect of porosity on mass transfer and conductivity. Therefore, it would have been within the skill of the ordinary artisan to adjust the porosity of the nonwoven mat of LeCostaouec as modified by Ilno et al. and Wilde et al. such that the porosity is within the applicants claimed pressure range in order for unhindered mass transfer without undue lowering of the conductivity. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) and Ilno et al. (U.S. Pub. No. 2002/0086198 A1) in view of Sakamoto et al. (U.S. bub. No. 2003/0180597 A1).

With respect to claim 5, LeCostaouec as modified by Ilno et al. disclose a bipolar plate in paragraph 3 above. LeCostaouec as modified by Ilno et al. do not specifically teach wherein the thermoplastic resin fibers are polyarylene sulfide resin-fibers. However, Sakamoto et al. disclose a conductive composition for solid polymer type fuel cell wherein, the functioning temperature of a polymer electrolyte fuel cell is generally

around 80 °C. Therefore, resins that have high durability under high temperatures are preferable. Examples of preferable resins include engineering plastics which resist deterioration due to hydrolysis or the like. Particularly preferable are thermoplastic engineering plastics (polyarylate resins, polyamide resins, polyarylene ether resins, polyarylene sulfide resins, polyaryl ether ketone resins, polyether imide resins, polyaryl sulfone resins, etc.). Among these, resins having a high chemical resistance and high strength are particularly preferable. Examples of preferable thermosetting resins include phenol resins (resol- or novolac-resin), epoxy resin, diallyl phthalate resin, etc. As the thermoplastic resins, in view of moldability, chemical resistance, durability, mechanical strength, and the like, poly(phenylene sulfide) resins, fluoro carbon resins, and the like are preferable (Paragraph 0083)

Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the polyarylene sulfide resin of Wilde et al.. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. because polyarylene sulfide resins have high durability under high temperatures.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1)

With respect to claim 6, LeCostaouec disclose a bipolar plate in paragraph 3 above. LeCostaouec do not specifically teach the electrically conductive powder is uniformly distributed with in the nonwoven fabric. However, it would have been

obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to distribute the conductive powder of LeCostaouec uniformly within the nonwoven fabric because in order have a defect free product that is uniform in conductivity. Ex Parte Smith, 83 USPQ.2d 1509, 1518-19 (BPAI, 2007) (citing KSR v. Teleflex, 127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1396 (2007)).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over LeCostaouec (U.S. 2003/0219646A1) and Ilno et al. (U.S. Pub. No. 2002/0086198 A1) in view of Kitade et al. (U.S. Patent No. 2003/0129471 A1).

With respect to claim 9, LeCostaouec as modified by Ilno et al. disclose a bipolar plate in paragraph 3 above. Applicant's specification recites that "a content of the conductive powder in the nonwoven fabric can be set as appropriate for the conductivity, mechanical strength, gas sealability, and other characteristics required of the target fuel cell bipolar plate. However, the content is preferably 70 wt % or more, and more preferably 80 wt % or more. By setting the content of the conductive powder within the above range, a low-resistance fuel cell bipolar plate having a volume resistivity in the thickness direction of 30 mOhm-cm or less can be manufactured. By using this fuel cell bipolar plate, a fuel cell having a better power generating efficiency can be achieved (Paragraph 0083).

However, Kitade et al. disclose a composite material for fuel separator (title) wherein, from the view point of properties such as surface smoothness of the obtained separator and cell performance, it is desirable that volatile components in the

carbonaceous powder are 2% by weight or less, particularly 1% by weight or less. Also, the fixed carbon content (electrically conductive carbon powder) is preferably 98% by weight or more, particularly preferably 99% by weight or more (Paragraph 0029). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the carbon content of Kitade et al. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. in order to enhance cell performance.

LeCostaouec as modified by Ilno et al. and Kitade et al. do not disclose any volume resistivity dada. However, it is the position of the examiner that such properties are inherent, given that LeCostaouec as modified by Ilno et al. and Kitade et al. and the present application utilize a percentage of conductive material that is within the claimed range of applicant that would result in the claimed resistivity value . A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

Response to Arguments

10. Applicant's arguments filed on August 25th, 2008 have been fully considered but they are not persuasive.

Applicant's principal arguments are

(a) La Costaouec teaches away from the claimed invention by disclosing the carbon fiber orientation in a direction parallel to the thickness of the plate. In contrast to La Costaouec, in the claimed invention the conductive powder is held within the entangled thermoplastic resin fibers in a fiber web. (Claim 1, Specification, p. 17, t. 3-17) The thermoplastic resin fibers are not oriented in any specific direction.

(b) Ilno cannot logically be combined with Le Costaouec for a rejection of the claimed invention. Ilno nowhere discloses a nonwoven fiber mat. Additionally, Ilno disclose a carbonaceous filler (component (D)) contained in the electrically conducting curable resin composition. (Ilno, paragraph 30) The carbonaceous fiber of Ilno has no relevance to the thermoplastic resin fibers of the claimed invention that form the nonwoven fabric. Therefore, Ilno cannot logically be combined with Le Costaouec to teach the diameter of the thermoplastic fibers of a nonwoven fiber mat.

(c) Costaouec teaches away from the claimed invention by requiring the disclosing the carbon fiber orientation in a direction parallel to the thickness of the plate. Further, Le Costaouec and Ilne, alone or in combination, do not teach or disclose the diameter of the resin fibers. In fact, Ilno does not disclose thermoplastic resin fibers at all. The cited

references, alone or in combination, to not teach or disclose the claimed invention. The Applicant respectfully requests reconsideration of the rejection under 35 U.S.C. 103(a).

(d) Additionally, Kitade does not compensate for the lack of disclosure by Le Costaouec and or Ilno of the diameter of the resin fibers as in amended claim 1. The references cannot logically be combined to form the 35 U.S.C. 103(a) rejection for the claimed invention. None of the references, alone or in combination, teach or disclose the diameter of the resin fibers as in the claimed invention. Claim 2 is dependent on claim 1 and thereby incorporates the limitations set forth therein. Applicants respectfully request reconsideration of the rejection under 35 U.S.C. 103(a).

(e) Wilde does not compensate for the lack of disclosure by Le Costaouec and or Ilno of the diameter of the resin fibers as in amended claim 1. The references cannot logically be combined to form the 35 U.S.C. 103(a) rejection for the claimed invention. None of the references, alone or in combination, teach or disclose the diameter of the resin fibers as in the claimed invention. Claim 4 is dependent on claim 1 and thereby incorporates the limitations set forth therein. Applicants respectfully request reconsideration of the rejection under 35 U.S.C. 103(a).

(f) None of the references disclose or suggest a method of entangling thermoplastic resin fibers into a nonwoven fabric. Therefore, the references cannot be combined to

teach the elements of the claim 5, which is dependent on claim 1. Sakamoto does not compensate for the lack of disclosure by Le Costaouec and or Ilno simply by the disclosure of resin. None of the references, alone or in combination, teach or disclose the method of the claimed invention. Further, neither Ilno or Sakamoto disclose a nonwoven fiber mat. Claim 5 is dependent on claim 1 and thereby incorporates the limitations set forth therein. Applicants respectfully request reconsideration of the rejection under 35 U.S.C. 103(a).

(g) Nevertheless, the cited references do not teach or disclose the diameter of the resin fibers as in amended claim 8. As discussed above, Le Costaouee teaches away from the claimed invention by disclosing the carbon fiber orientation in a direction parallel to the thickness of the plate. Further, line does not teach or disclose a nonwoven fabric and the carbonaceous fiber of Ilno has no relevance to the thermoplastic resin fibers of the claimed invention that form the nonwoven Fabric. The references cannot logically be combined to form the 35 U.S.C. 103(a) rejection for the claimed invention. Claim 9 is dependent on claim 8 and thereby incorporates the limitations set forth therein. Applicants respectfully request reconsideration of the rejection under 35 U.S.C. 103(a).

In response to Applicant's arguments, please consider the following comments.

(a) and (c) LeCostaouec disclose carbon fiber reinforced plastic bipolar plates (title) wherein, the starting fiber reinforcement can take on a variety of forms but essentially involves a carbon fiber mat which is woven, non-woven (entangled), knit, stitch bonded or a combination of woven, knit, stitch bonded and staple fibers. The mat is subsequently needle punched to orient a large portion of the carbon fibers in the through thickness direction, allowing it to achieve maximum electrical conductivity in the direction where it is the most important. For the bipolar plate, the preferred path is parallel to the plate thickness. Such a carbonaceous mat may include thermoplastic fibers which are then heat molded into the desired shape to create grooves or other surface features heretofore typically achieved by machining. Alternatively, the mats may be impregnated with a thermoplastic resin (powder or solution form) and molded to shape using suitable temperature and pressure (Paragraph 0014). (Examiner notes that the nonwoven mat of LeCostaouec is made of entangled carbon fibers. The punching of the carbon fiber mat of LeCostaouec is to enhance electrical conductivity and does not alter the fact that the carbon fibers of LeCostauec are nonwoven (entangled)).

(b) and (c) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one

of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 .2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Therefore it would have been obvious to one of ordinary skill in the art to incorporate the fiber diameter of Ilno et al. in the separator production of Le Costaouec because Ilno et al. teach that from the standpoint of improving the electrical and mechanical properties, the carbon short fiber is more preferably vapor grown carbon fiber having a fiber diameter of 0.05 to 10 μm and a fiber length of 1 μm to 5 μm and/or carbon nanotube having a fiber diameter of 0.005 to 5 μm and a fiber length of 1 to 100 μm (Paragraph 0030).

(d) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 .2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kitade et al. disclose a composite material for fuel separator (title) wherein, from the view point of properties such as surface smoothness of the obtained separator and cell performance, it is desirable that volatile components in the carbonaceous powder are 2% by weight or less, particularly 1% by weight or less. Also, the fixed carbon content (electrically conductive carbon powder) is preferably 98% by weight or more, particularly

preferably 99% by weight or more (Paragraph 0029). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the carbon content of Kitade et al. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. in order to enhance cell performance.

(e) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 .2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Wilde et al. disclose a carbon fiber electrode substrate for electrochemical cells (title) wherein, The electrode substrate of the invention is obtained as rolled good (rollable to a reel diameter of from about 250 to about 300 mm) with a large porosity (in excess of 80%) as necessary for unhindered mass transfer without undue lowering of the conductivity (Paragraph 0022). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the separator porosity of Wilde et al. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. so that there would be unhindered mass transfer of the filler material without undue lowering of the conductivity.

(f) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 .2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Sakamoto et al. disclose a conductive composition for solid polymer type fuel cell wherein, the functioning temperature of a polymer electrolyte fuel cell is generally around 80 °C. Therefore, resins that have high durability under high temperatures are preferable. Examples of preferable resins include engineering plastics which resist deterioration due to hydrolysis or the like. Particularly preferable are thermoplastic engineering plastics (polyarylate resins, polyamide resins, polyarylene ether resins, polyarylene sulfide resins, polyaryl ether ketone resins, polyether imide resins, polyaryl sulfone resins, etc.). Among these, resins having a high chemical resistance and high strength are particularly preferable. Examples of preferable thermosetting resins include phenol resins (resol- or novolac-resin), epoxy resin, diallyl phthalate resin, etc. As the thermoplastic resins, in view of moldability, chemical resistance, durability, mechanical strength, and the like, poly(phenylene sulfide) resins, fluoro carbon resins, and the like are preferable (Paragraph 0083)

Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the polyarylene sulfide resin of Wilde et al.. into the bipolar plate fabrication of LeCostaouec as modified by Ilno et al. because polyarylene sulfide resins have high durability under high temperatures.

(g) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 958 .2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Kitade et al. disclose a composite material for fuel separator (title) wherein, from the view point of properties such as surface smoothness of the obtained separator and cell performance, it is desirable that volatile components in the carbonaceous powder are 2% by weight or less, particularly 1% by weight or less. Also, the fixed carbon content (electrically conductive carbon powder) is preferably 98% by weight or more, particularly preferably 99% by weight or more (Paragraph 0029). Therefore it would have been obvious to one of ordinary skill in the fuel cell bipolar plate manufacturing art at the time the invention was made to incorporate the carbon content of Kitade et al. into the bipolar plate

fabrication of LeCostaouec as modified by Ilno et al. in order to enhance cell performance.

LeCostaouec as modified by Ilno et al. and Kitade et al. do not disclose any volume resistivity dada. However, it is the position of the examiner that such properties are inherent, given that LeCostaouec as modified by Ilno et al. and Kitade et al. and the present application utilize a percentage of conductive material that is within the claimed range of applicant that would result in the claimed resistivity value . A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

(b), (c), (d), (e), (f) and (g) Examiner notes that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Ben Lewis/

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795